Sub-Element 4.c—Laboratory Operations

What the Policy Says	Intent NUREG-0654 provides that OROs should have the capability to perform laboratory analyses of radioactivity in air, liquid, and environmental samples to support protective action decision-making. **Criterion 4.c.1:** The laboratory is capable of performing required radiological analyses to support protective action decisions. (NUREG-0654, C.3; J.11). **Frequency** Criterion 4.c.1 is to be evaluated once in 6 years. **Extent of Play** The laboratory staff should demonstrate the capability to follow appropriate procedures for receiving samples, including logging of information, preventing contamination of the laboratory, preventing buildup of background radiation due to stored samples, preventing cross contamination of samples, preserving samples that may spoil (for example, milk), and keeping track of sample identity. In addition, the laboratory staff should demonstrate the capability to prepare samples for conducting measurements. The laboratory should be appropriately equipped to provide analyses of media, as requested, on a timely basis, of sufficient quality and sensitivity to support assessments and decisions as anticipated by the ORO's plans and procedures. The laboratory (laboratories) instrument calibrations should be traceable to standards provided by the National Institute of Standards and Technology. Laboratory methods used to analyze typical radionuclides released in a reactor incident should be as described in the plans and procedures. New or revised methods may be used to analyze atypical radionuclide releases (for example, transuranics or as a result of a terrorist event) or if warranted by circumstances of the event. Analysis may require resources beyond those of the ORO. The laboratory staff should be qualified in radioanalytical techniques and contamination control procedures. OROs should use Federal resources as identified in the FRERP, and other resources (for example, compacts, utility, nuclear insurers, etc.), if available. Evaluation of this criterion will take into consideration the level of Federal and other resources participating in the exercise. All activities must be based on the ORO's plans and procedures and completed as they would be in an actual emergency, unless noted above or otherwise indicated in the extent of play agreement.

Preparing to Evaluate This Criterion	Before the exercise, determine, according to the ORO's plan/procedures and the Extent of Play agreement: • What laboratory is designated to demonstrate this criterion? • Which radionuclides, that typically might be released in a reactor accident, does the designated laboratory have the capability to analyze? Does the laboratory have the capability to analyze atypical nuclides such as transuranics or nuclides that might be used by terrorists? • What is the highest contact radiation reading allowed on any sample that is to be processed by the laboratory, if any? • If the laboratory lacks the capability to analyze certain radionuclides or receives a sample that exceeds a radiation reading limit, what arrangements are in place to obtain the analysis of these nuclides? • How and how often are the instruments used in the laboratory calibrated? Are all instrument calibrations traceable to (National Institute of Standards and Technology (NIST) standards? If not, what standard is the basis for the calibrations? • How are sample stored to reduce the potential for increased background levels in the laboratory? • How are samples prepared for counting and what contamination control procedures are used during this process? • How are sample aliquot sizes documented? • How have the sample count times been modified to account for samples with higher radioisotope levels than normal? • What sample preservation techniques are to be employed? • How are chain-of-custody forms processed and sample integrity maintained?
During the Exercise	During the exercise, in addition to evaluating activities related to the items listed above, be sure to: • Document all controller injects. • Document (or obtain copies of) calibration results. • Observe sample preparation with particular attention to contamination control and sample aliquot documentation. • Observe the transmission of analytical results to the appropriate location.